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# *Progress Report..*

COORDINATED ACTIVITIES

## **MECHANIZATION OF TRAIL MAINTENANCE AND TRAVEL**

T. E. B. Number 513  
Regions 1, 4, 5, and 6



COMPILED BY  
H. K. HARRIS, FORESTER, REGION 1

FOREST SERVICE  
U. S. DEPARTMENT OF AGRICULTURE

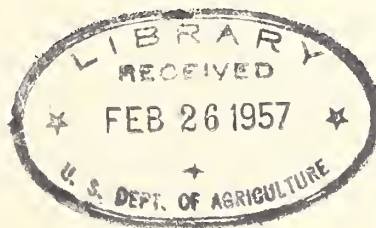
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COORDINATED ACTIVITIES - PROGRESS REPORT  
MECHANIZATION OF TRAIL MAINTENANCE AND TRAVEL  
(T.E.B. #513 - Regions 1, 4, 5, and 6)



Compiled By  
H. K. Harris, Forester, Region 1



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COORDINATED ACTIVITIES - PROGRESS REPORT  
MECHANIZATION OF TRAIL MAINTENANCE AND TRAVEL

Regions 1, 4, 5 and 6

(T.E.B. #513)

INTRODUCTION

In many instances mechanization in forestry has not kept pace with the changing situations and needs in forestry work. There are many times when we are forced to use obsolete methods or large numbers of laborers because suitable powered tools or machines have not been developed, or where we forego work that needs to be done because our conventional equipment and methods make it impractical.

This is the situation with regard to trail maintenance work in many areas. Greatly increased costs for labor, maintenance of pack and saddle stock, subsistence, and materials - in combination with shorter working hours and reduced employee production - has resulted in the proper maintenance of only a portion of the trail system each season. The backlog of deferred maintenance work continues to grow more imposing with little probability of increased funds sufficient to "break even."

In the past, we have successfully developed specialized equipment to meet the needs of certain activities in certain areas and have demonstrated that the development of new methods and new equipment is often the key to future progress. It is time that we take a fresh look at our trail maintenance problem. The power chain saw has demonstrated the possibilities for mechanization. Many commercial products appear to have application.

We feel confident that an objective review of present trail maintenance and construction methods, production, and the high cost of non-effective or non-productive work (transportation of equipment and slow travel at two-miles-per-hour speeds are examples), will convince you, too, of the urgent need for development of any special equipment which might be needed. Costs for development and investigative work will be repaid many times over by future savings!





The blaze on the snag designates this as a Forest Service trail. This photo could be supplemented with many others illustrating "bottlenecks" to travel by anything but stock or tired men on foot.

One primary objective of the mechanization program is to make selected trails passable for light and inexpensive powered carriers for men and equipment. Only a narrow tread is required here to make possible substantial savings through increased production and reduced non-effective work time and expense.



## HISTORY

Machines for trail travel and work have been proposed by administrators many times over the years. The earliest known proposal suggested the use of narrow tread tractors pulling one or more wagons with steering arranged so that each one would follow the track of the power unit. Region 1 modified three Gregg scooters as early as 1937. These machines were tested for trail travel and smokechasing on the Clearwater, Lolo and Flathead Forests. Their use was not successful because of the low standard of most existing trails. Region 6 revived the scooter possibilities later and also developed the Beetle Trail Tractor, the Iron Mule and the Baby Trail Grader. Other regions and people have contributed important ideas and equipment to the mechanization program.

A work improvement suggestion (#529, December 16, 1948) is believed to be the first proposal for a trail maintenance machine to travel narrow tread (18-inch or less) trails, provide power for accessory equipment, and carry a light 2-man trail maintenance and camp outfit. Questions regarding the possibilities were posed by the Washington office and contained in memorandum, O - STUDIES - Work Improvement, No. 237 and E - EQUIPMENT & MATERIALS - Experimental of April 26, 1950.

Region 1 proposed an all-Service development program in 1953 to be financed jointly by Region 1 and the Washington office. The proposal was approved by the Forest Service Technical Equipment Board and financing arranged for F.Y. 1954. The Division of Engineering, Missoula, Montana was assigned the development project.

### T.E.B. No. 326

The all-Service project on mechanization of trail maintenance and travel made a slow start in 1953. Final approval and financing was not completed until most of the summer season was gone. Considerable progress, however, was made in development and testing of the powered carrier and special camp items. Following the maintenance season of 1954, an Interim Report was published by Engineering which received wide in-Service distribution. 1/

As a result of this report and wide-spread interest in the possibilities, a meeting of representatives from Regions 1, 4, 5, 6 and the Washington office was held at Missoula, Montana, May 2-4, 1955 for the primary purpose of reviewing progress and results of the all-Service development project.

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1/ E - ROADS & TRAILS - General, Development Report T.E.B. #326, January 17, 1955, compiled by R. J. Henderson and A. E. Allen.

It was the unanimous opinion of this group that most of the machines, camp equipment and methods so far developed were acceptable in the present form for immediate use by interested regions. We recognized that improvements would be necessary to realize full benefits from the equipment.

The group was also unanimous in expression of need for immediate action to speed progress in improving trail conditions through mechanization of trail maintenance and travel. It was concluded that faster progress might be made and that it was desirable to initiate immediately a program of active participation by Regions 1, 4, 5 and 6. H. K. Harris, Forester in charge of Equipment Development, Region 1, was selected as coordinator for the operational testing and further development of equipment and methods. 1/

A committee recommendation proposed that supervisors selected by regional foresters (Regions 1, 4, 5 and 6) meet prior to the field season for the purpose of establishing uniform procedures in the coordinated effort.

On June 15 and 16, 1955, representatives of Regions 1, 4, 5 and 6 and the Washington office, met at Missoula, Montana to prepare an action plan. 2/

On June 12 and 13, 1956, the Service Coordinator met with Regional Coordinators and others at Portland, Oregon to discuss the assembly of material for the program report, necessary or desirable modifications and distribution of the action plan, and assignment of new responsibilities for investigative report and other work for F.Y. 1957. 3/

#### OBJECTIVES OF THE COORDINATED EFFORT

1. Urge immediate action by participating regions to make use of machines, camp equipment and new methods presently available and which have possibilities in increasing production and reducing costs.
2. Accelerate mechanization of trail maintenance and travel through broader contact with commercial markets, intensified search for useable equipment and ideas, and operational testing under widely-diversified field conditions of new equipment and methods.

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- 1/ Report of Meeting on Mechanical Trail Maintenance, May 2, 3, 4, 1955 by L. H. LaFaver, (with Resume of Field Demonstrations, May 3, 1955).
  - 2/ "Action Plan for Interregional Coordination of Mechanization of Trail Maintenance and Travel Project T.E.B. #326." Distributed to Washington office and interested regions.
  - 3/ Editor's Note: A modernized plan is proposed for early printing and will be available by writing Regional Foresters, Regions 1, 4, 5, 6 and/or the Washington office. Sufficient copies of the first plan, to fill requests, were not available without reprinting.

3. Provide experience needed to formulate new trail standards or necessary modification and planning guides, needed to meet mechanized requirements, and develop basis for replanning work.
4. Encourage cooperative commercial development or improvement to present equipment by coordinated information on design requirements, mechanical failures, accessory needs, anticipated quantity purchases and standard or comparable purchase specifications.
5. Develop uniform measure of cost and production for future comparison of new methods or equipment.
6. Report and record accurately, the findings with standardized cost estimates for benefit of other interested regions.

### CONSIDERATIONS

It was recognized that basic and uniform considerations should be established for development of the action plan and as general guidelines for individual effort. The following considerations were established by group meeting of coordinators June 15 and 16, 1955; and these considerations reviewed and improved at the coordinators meeting June 12 and 13, 1956.

1. Machines and equipment will be made more dependable or otherwise improved through experience. There will be problems connected with the use of the "Model-T" stage equipment. It is important that regional coordinators minimize the danger by basic training in the important considerations.
2. Cost analysis provides the only solid and uniform basis for comparison of one new method against another. A standard system of cost and production accounting is necessary to effective coordination, future development and uniform and accurate reporting.
3. Although new methods already developed and tested would undoubtedly do much to improve "mule or horse maintenance," it is agreed that comparisons of machines versus mules will buy little in future development. The comparison is, therefore, discontinued in order to simplify the problem.
4. New or modified trail standards and improved trail system planning guides will ultimately be necessary to greatest progress. Each region will search for and record information and suggestions for making future and necessary changes as uniform as possible from the Service standpoint.



5. Qualified supervision from the regional level is recognized as top priority at this stage of the development. Regions should provide adequate supervision for planning, inspection, training, reporting and development and field testing of new ideas and equipment. Properly and adequately supervised, this coordinated activity will stimulate early progress and accomplishment.
6. Commercial production of equipment will be encouraged. Regions will manufacture test machines and equipment only as necessary to determine specifications, design arrangements and cost estimates, or when the needed equipment cannot be obtained commercially. Whenever possible, consolidated orders for new equipment will be made to encourage commercial manufacturers to improve existing equipment and cooperate in new development work.
7. Suggested improvement of methods, subsistence and camp equipment or machines will be encouraged. Uniform cost accounting will provide basis for comparison of worth and will be obtained whenever possible as well as report information and photographs.
8. Accurate and thorough reporting is necessary. Regional Coordinators will make every effort and take necessary steps to insure that standard and uniform records and photographs are maintained on all field-test or development work.
9. A necessary part of the development is the search for new ideas and new equipment which may have application to the program. Procedures for current review and dissemination of interesting information should be considered in the orientation sessions. Properly handled by the Regional Coordinators (with information for the Service Coordinator), this will make possible the purchase and test of new items or ideas without duplication of cost and effort. Clearance on unusual items must be secured from the Service Coordinator to avoid duplication in the coordinated effort.
10. Based upon studies and the findings of T.E.B. project #326, the special powered carriers for transportation of personnel and equipment and trail graders, should be suited for travel or work on trails with a maximum tread width of 18 inches.
11. Mechanization includes the use of dozers for trail maintenance and construction and the use of standard 4-wheel drive equipment for travel. Careful consideration of all factors is necessary to determine areas and conditions. In general, dozers will be used to construct trails only in selected areas and where conditions are such that dozer construction is definitely the most economical method. Consideration must also be given to the control or regulation of any travel by 4-wheel drive vehicles.

12. In general, the mechanization of trail maintenance and travel does not presume that machines will eliminate all need for horses and mules. Animals will always hold a necessary place in many areas and the results of mechanization will determine where and how reductions in pack-stock may be safely made.

At the present time, we estimate that perhaps 50 percent of the trail mileage may be economically improved for powered carrier and scooter travel. Replanning and modernization of the trail systems along with transportation planning will be required to determine where mechanization will provide the most immediate financial returns and administrative benefits.

### ORGANIZATION

The organization or coordinating group is composed of a representative from each participating region selected by the regional forester and called the Regional Coordinator; Project Supervisors (including field specialists) also selected by the regional forester; a Service Coordinator selected at the interregional Engineering meeting held at Missoula; and a Project Advisor to represent the Chief's office.

The present organization consists of the following personnel:

Service Coordinator	R-1	H. K. Harris	Fire Control
Regional Coordinator	R-1	Earl Angell	Engineering
Regional Coordinator	R-4	Jim Wise	Engineering
Regional Coordinator	R-5	Al Simpson	Engineering
Regional Coordinator	R-6	Elliott Roberts	Engineering

Mr. L. H. LaFaver, Washington office representative, was the Project Advisor and deserves much credit for getting the cooperative project under way. LaFaver has since accepted another position and we are requesting that another advisor be appointed by the Chief.

Specialists and others who are known to have contributed considerable time and effort towards mechanization of trail maintenance and travel are:

R-1	R. J. Henderson
R-1	H. T. Wicklund
R-4	H. W. Parks
R-5	E. E. Silva
R-6	L. A. Waggener
R-6	V. V. Church
R-6	Don Fife

Approved Regional Assignments - F.Y. 1956  
(Forest Service Technical Equipment Board)

Assignments for investigative and development work approved for F.Y. 1956 consisted of the following:

T.E.B. #326 - Mechanization of Trail Maintenance and Travel. This project was approved and financed for continuation in F.Y. 1956 and \$5950 Servicewide funds and \$9000 regional funds were provided.

T.E.B. #513 - Interregional Coordination of Mechanization Activities. \$1745 of all-Service funds were allotted Region 1 for this activity F.Y. 1956.

T.E.B. #514 - Follow-up Trail Scooter Development. \$1300 of Servicewide funds were allotted Region 1, F.Y. 1956.

T.E.B. #515 - Trail Spray Outfit. \$1600 of Servicewide funds allotted for F.Y. 1956. (a) Region 1 to investigate power take-off possibilities, use of high-pressure pump, tanks for powered carriers, and spraying methods and results. (b) Region 5 to investigate mist blower possibilities. \$250 regional funds requested and authorized.

T.E.B. #516 - Sluff Removal Attachment for Powered Carriers. Financing deferred. Regions to watch and encourage commercial development.

T.E.B. #551 - Hydraulic Rock Wedges. Financing deferred. To continue search for suitable equipment.

T.E.B. #553 - Investigate Shaped-Charge Explosives Assigned Region 4. \$500 regional funds authorized.

T.E.B. # 554 - Investigate Rock Demolition by Special Effects. \$500 of Servicewide funds allotted Arcadia Equipment Development Center.

T.E.B. #555 - Powered Vehicle for Combined Use as Trail Spray Rig and for Transporting Compressor. \$1500 of Servicewide funds allotted Arcadia Equipment Development Center for this project.

FIELD ACTIVITIES - RESULTS - PROGRESS F.Y. 1956

Region 1

The region has continued the original approved project (T.E.B. #326), on trails selected for mechanization, on the Bitterroot and Lolo Forests. The Equipment Development Report (now in the review stage) indicates a promising future for mechanization. From the region's experience, it is believed that selected trails may be improved for scooter and/or powered carrier travel for approximately \$30 per mile. Maintenance costs on trails previously



improved are expected to average approximately \$5 per mile for labor and machine expense. Part of the anticipated savings are due to scooter maintenance on mechanized trails where travel costs are considerably reduced. The average travel speed by scooters in 1955 was 7 miles per hour (increased from 6 miles per hour average in 1954).

The O'Neil carriers have been used to the greatest extent with only limited experience gained on the Merry and the Lilienthal-Simpson. All carriers used in the experiment were equipped with aluminum ration boxes, extra gasoline tank with fuel for powered tools, water tank for dry camps, and special lightweight camp outfits.

Two commercial scooters have been used extensively and three special Forest Service designed models used in operational testing. A lightweight scooter maintenance outfit is being tried this summer. All scooters used in trail maintenance work are arranged to carry a powered chain saw for logging-out operations.

As a result of the mechanization program, a plan has been approved for mechanization of approximately 1000 miles of selected trail per year in Region 1, beginning F.Y. 1957. General highlights of the plan are:

1. Organization

Project Supervisor (Forester GS-11) assigned to regional office and responsible for the over-all direction of the project, detailed trail planning and coordination with transportation plans and supervision of field specialists.

Field Specialist (GS-9) assigned to the region office and responsible for the direction, supervision, training and safety of field crews.

Trail Scout provided by the forest, where work is projected, and responsible for scouting and field information not otherwise available for planning and trail selection.

Foremen of Machine Crews provided by the forest(s), trained and instructed in new methods of trail maintenance, operation of powered equipment, and maintenance of special records.

Laborers provided by forest(s).

2. Equipment

Powered and other equipment will be purchased as needed to "mechanize" approximately 1000 miles per year. Equipment will include powered carriers, scooters, graders, winches, chain saws, brush saws, special camp outfits, spray and rock-drilling equipment, radios, and other items to increase production.



Following the initial "attack," sufficient equipment will be left on the ranger districts to maintain the trails mechanized by the "attack forces," and new equipment for the "pool" as needed.

### 3. Financing

Approximately \$30,000 will be used to "mechanize" 1000 miles of selected trail annually. Equipment purchase, in addition to this amount, will require approximately \$6500 per year following the initial investment of \$10,000. With savings estimated at \$5 per mile, it will require approximately 12 years to amortize the total investment.

### 4. General

It is recognized that \$30 per mile for the needed improvements is inadequate for many trails. Present plans contemplate mechanization of only a selected portion of the existing trail system (estimated to be approximately 12,000 miles in Region 1). Careful planning and field scouting is required to make the proper selection which will give the most immediate returns and provide savings for use on more expensive jobs.

It is also recognized that because of the low standard of many trails that "mechanization" may first include only the removal of "bottlenecks" to scooter and/or powered carrier travel. This may result in an "interim" standard (better than we now have, but not necessarily the most desirable) which will permit future savings through faster travel, reduced noneffective work time, and increased work production.

#### Region 4

The region purchased or used 6 powered carriers in 1955. Majority of experience has been with the Lilienthal-Simpson type (2 drive wheels in tandem arrangement). As a result of their experience and reports to the Service Coordinator, improvements to all three machines have been made. Especially important to the project is the operational test of the Lilienthal-Simpson units.

This machine has exceptional performance and because of the tandem arrangement of the driving wheels, very good fore-and-aft torque control when going up or down steep grades. The present design is, however, difficult to balance because of a high center of gravity due to the loading on top of the wheels and to the steering qualities when going around switchbacks and sharp curves where the trail tread is rough or rock-bound. As a result of reports from Region 4 (also from Region 5) to the Service Coordinator, we have tested an improved machine with one unit now under construction for field use. This machine is believed to be a big improvement over the earlier models and as soon as we are sure of our ground, the modified design will be given to Lilienthal-Simpson Manufacturing Company for consideration in future production.

The region has also been assigned T.E.B. project #553 to investigate possibilities of shaped-charge explosives. A supply of shaped charges has been obtained but these arrived too late for test work last fall. Reports will be available following this summer's work. Region 6 has agreed to send a man with considerable experience to help conduct tests and exchange experience. Tests are scheduled soon on the Boise Forest.

Region 4 is just getting into the mechanization effort. They plan to increase the number of machines as experience dictates.

#### Region 5

The region has purchased 6 powered carriers for use on 3 forests. These were received too late last season for thorough testing and a report on results.

T.E.B. project #515, Investigate Mist Blower Possibilities, was assigned to Region 5 and will be continued in F.Y. 1957. This project involves test of some commercial equipment which is in the experimental stage and only one or two units are available. It may take some time to complete arrangements for use of a pilot machine. There appear to be good possibilities for spraying trail-side brush, however, with comparatively light and inexpensive equipment.

Reports from Region 5 on powered carriers have resulted in improvement to all machines. Their report on the Lilienthal-Simpson machine supported the findings of Region 4 and have resulted in, we believe, a more successful design now ready for operational testing.

The region has purchased and used an electric drilling unit consisting of lightweight generator, electric blower unit, and electric drill with several attachments for rock work. This has been used only to a limited extent on trail work but it is planned to report on these possibilities at a later date.

The Arcadia Equipment Development Center, Region 5, has been assigned two projects of interest to the mechanized program (T.E.B. #554 and 555). Progress on these projects will be reported at a later date.

#### Region 6

Region 6 now has 18 powered carriers, 11 powered trail graders, 1 scooter and a compressor unit mounted on a powered carrier for rock work. Experience with carriers has been largely confined to the Merry Packer and the region has been working closely with the manufacturer on the development and on improvements. Work with the grader has included the use of a powered winch which is believed will prove to be a major contribution to the mechanization program.

Recognizing the need for special and thorough training in the use of powered equipment and new methods, the region this spring conducted a series of training schools. The sound movie, "Mechanized Trail Maintenance and Travel," was shown at the start of each training session to gain interest and to illustrate to trainees the progress to date in the field of mechanical trail equipment.

Highlights of this series of training sessions are:

1. Instructors were Don Fife, V. V. Church, and L. A. Waggener.
2. Eight training sessions of two days each were held with an additional and special program arranged for the regional foresters and others of the regional office.

3. Totals - Number of field-training sessions	8
Number of forests represented	15
Number of forest personnel	165
Other attendance	11
	<hr/>
Total Attendance	176

Powered equipment was loaded on trucks and hauled to each training area. Sufficient machines were available for individual training and experience. The summary of the report is quoted in part:

"A sizeable minority of the trainees arrived at the sessions with an attitude of indifference toward the equipment and its use. I am pleased to state that I know of nobody who left at the close of each session in the same frame of mind. A chance to see and learn how the equipment will do the jobs of trail maintenance and construction did the trick. Rangers were very enthusiastic over the trail grader's ability to construct erosion-control ditches in logging skid-roads. They and their district assistants expressed interest in the machine's fireline construction ability. . . ."

#### Equipment Development - Progress Report

Considerable time has been spent in testing and comparing various items of camp equipment, trail rations, and commercially available powered equipment. This is a necessary and important part of the project and will be of value in assembly of an equipment catalog for in-Service distribution.

#### Trail Scooter Developments

Three models of the stand-on lightweight trail scooters have been built and tested. One or more of the units has been demonstrated in Regions 4, 5 and 6. Each pilot model incorporates features for tests which are important to the



final specification for construction of commercial models. It is necessary that we be quite sure of our requirements before asking manufacturers to build machines. We are about ready to make final specifications.

The latest model tested incorporates very large tires, 8 inches across and with 4-inch hubs, which appear to have a definite advantage for trail travel. These tires, with special hub design and without tubes, absorb shocks of rough trail travel and provide extra traction for steep grades or side-hill trails.

Contact with commercial firms interested in manufacturing the scooter will be made this year. No all-Service funds were requested for F.Y. 1957. A detailed report will be made available soon.

#### Trail Spray Outfit and Methods

The Equipment Development section has purchased an O'Neil Carrier equipped with aluminum spray tanks, plumbing and gear-type high-pressure pump. Power for the pump was provided by the carrier motor.

From the spraying tests it appears that trail-side brush spraying is practical and economical for many brush conditions. The spray unit as arranged was not generally satisfactory and gave considerable trouble. This was also the experience with a unit purchased by Region 5.

Our present recommendations are that a separate motor with integral pump be used. It is believed that a self-contained spray unit, that may be mounted on any available carrier, will be much more useable in the mechanized trail maintenance program. We propose to investigate the commercial possibilities for components to assemble a unit for field use this year. A T.E.B. report will be made available soon.

#### Powered Carriers

Considerable time has been spent by all regions in working with commercial manufacturers of this equipment. Although present machines are practical and useable, we believe much improvement can and will be made. There are at present, three general types of commercial carriers being used. We have a request to provide a detailed report on the development and hope to make it this summer.

A T.E.B. proposal has been approved for continued development and improvement in F.Y. 1957.

## Interregional Coordination

A T.E.B. proposal has been approved for continuation of this project in F.Y. 1957. The original proposal anticipated continuation through F.Y. 1958.

The Service Coordinator has made field trips in Regions 4 and 5 in company with the Regional Coordinators and attended two training sessions in Region 6.

Two group meetings of the Service and Regional Coordinators and others were held for organizing and improving the coordinated activity. An action plan has been prepared and effectively used in F.Y. 1956. A 20-minute sound movie on mechanization of trail maintenance and travel was made and has received much favorable comment from the field and at the National Fire Equipment meeting where it was shown this spring. Three additional copies have been ordered by interested regions.

It is believed that the coordinated activity is just getting well under way and that greatest benefits and progress will result from the circulation of information and test of equipment and methods under widely varying conditions.

### RECOMMENDATIONS FOR ACTION F.Y. 1957

The Service Coordinator, Regional Coordinators, and other closely associated with the mechanization effort, met at Portland, Oregon June 12 and 13, 1956. The meeting was called to discuss preparation and information for this progress report, to review and modernize the action plan, to review status of regional planning, and to assign new responsibilities in the coordinated program. The following action, recommendations and assignments are a result of this meeting:

#### Action Plan

1. After some revision, the action plan will be reprinted with sufficient copies for use by all field forces and for general distribution.
2. The section on commercial equipment will be eliminated from the action plan and incorporated in an "Equipment Catalog" for temporary in-Service distribution only. The catalog will be arranged for inclusion of new information as it becomes available and will provide a guide for ordering suitable equipment for mechanized trail maintenance. Individual sheets from the catalog may be used to partially answer some of the many requests for information.

### ASSIGNMENT OF RESPONSIBILITIES F.Y. 1957

The group recognized the broad field of development and investigative work necessary. Assignments to provide information needed for the equipment catalog, for future reports, and to avoid duplicate effort and expense were agreed upon as follows:

RegionAssignment

4	Syntron gasoline hammer for rock drilling in trail work.
5	Homelite electric drilling outfit.
4	Shaped charges.
5	Homelite special mist blower for brush spraying.
6	Applications for powered winch.
6	Possibilities and arrangements for powered gravel carrier.
6	Compressor and air drill unit for trail work.
1-6	Creek crossings for mechanized trails - methods and improvements.
6	Results of 2-speed arrangement for Merry carrier now being tested.
4	Grading attachment for Lilienthal-Simpson carrier.
5	Riding attachment for Lilienthal-Simpson carrier.
1	Stand-on scooter development.
1	Commercial scooters - modifications.
1	"Jet piercing" method of rock drilling.
1	Possibilities of diamond-core drills powered by chain-saw motors.
1	Modifications to improve steering and handling of Lilienthal-Simpson carriers.
6	Work with Merry on development of accessory items for Merry Packer.
1	Design and test improved stove for mechanized crews.
1	Continue investigation of special rations, dehydrated food, etc.
1	Investigate possibilities for disposable paper plates, cups, etc.
6	Pionjar gasoline hammer-drill.
1	Use of small tractor with "Hula dozer" blade.
1	Development of gasoline-powered spray unit for use with any carrier.
All	Report information on new equipment to Service Coordinator with recommendations before purchasing units for test.

## MEETING OF COORDINATORS - 1957

It was agreed that we should have an annual meeting of coordinators and that the next meeting be held in February 1957. This would permit the group to recommend and prepare project proposals for T.E.B. consideration and prepare a progress report for earlier information of the Technical Equipment Boards and other interested persons and agencies. The Service Coordinator was directed to request appointment of an advisor from the Washington office to assist in the coordinated effort.

## TRAINING AND INFORMATION MEDIA

It was the opinion of the Coordinators that another motion picture on mechanization of trail maintenance and travel would be very much worth while. The picture should serve as a sequel to the original 20-minute report-type picture and include a greater variety of machines with emphasis on training of field personnel.

The group also agreed that we should now prepare and distribute general training outlines for mechanized crews. We recognize that much is yet to be learned on methods and use of equipment, but many of the troubles experienced to date have been at least partially caused by inadequate training and supervision. Powered carriers are being purchased by forests and districts, and crews are being started without benefit of experienced trainers.

## CONCLUSION

The Service Coordinator and Regional Coordinators are unanimously agreed that although we will have rough spots ahead, the experience to date indicates a successful final result in mechanization of trail maintenance and travel.





